Mobile Marine Under Sail

Combining boating and ham radio can be both useful and fun. Here is how one ham gets his kicks.

By Brandon Wentworth,* K6UJ

This story is aimed at offering a few ideas and suggestions which might be helpful to those amateurs who contemplate combining radio operating with small-boat sailing. The information is derived through experience gained from a transceiver installation made several years ago aboard my little 27-foot fiberglass sloop *Flicka*. Ham radio has been great fun to operate and once proved most useful in a near emergency.

Ground Problems

Since an efficient, low-resistance ground system on any vessel can be a key to strong signals on the high frequencies, it is, indeed, a pity that the *China Clipper* era was born too soon, over a century before the heavy copper sheathing on those long sleek wooden hulls would have made the ideal salt-water ground. Today, because of the high cost of copper, the ready availability of effective antifouling bottom paint and the fact that fiberglass is impervious to teredos (sea-going termites!), we must devise other means for affixing a good ground system to a nonmetallic hull.

Regretfully perhaps, my expertise on this subject is quite limited. My only other confrontation with marine-radio installations goes back to the 1920s. I recall that one of my last ships was an oil tanker equipped with a 2-kW Federal arc transmitter and a single-tube (detector) receiver! Therefore, my "words of wisdom" herein are necessarily confined to the lessons learned aboard *Flicka*.

Of the relatively few ground-system options open to a fiberglass hull, I chose the one which consists of trailing copper astern. It is made up of two 2-foot lengths and one 18-inch length of 5/8-inch copper tubing projected under water by three hard-drawn copper bars, raked aft to avoid snagging seaweed when the boat is underway. The tubing is fastened to the bars with copper rivets. The bars are attached to the lower edge of a 1/2-inch aluminum plate with 1-inch aluminum brackets. This plate serves primarily as a mount for the outboard-motor suspension bracket. The aluminum plate in turn is supported by two solid stainless-steel rods which are built into and project through the top part of the transom. The inboard end of these rods is connected beneath the deck by No. 6 stranded copper wire to the after pulpit bolts and to a deck-mounted copper-pipe flange and 1-inch copper pipe which support the antenna.

The Antenna Installation

The antenna is installed on the extreme stern, port side, where it is clear of the main sheet and other running rigging. It is a Hy-Gain 14 AVQ, 10- through 40-meter trap vertical. This model was selected because of its rugged, seamless aluminum tubing construction. During the many months it has seen service, it has often been subjected to the boat's rather violent pitching while beating to windward in a short, steep chop. It has withstood this "crack the whip" punishment with no permanent bending or buckling of any kind. Other than an additional support bracket installed between the antenna base section and the pulpit rail, there has been no need for guy lines or other extra supports. Actually, the pulpit bracket is primarily to prevent the copper-pipe flange from being literally pried off the deck by leverage which would otherwise be exerted by the swaying antenna during rough going.

The antenna is adjusted as to length (height) and trap spacing in accordance with the manufacturer's specifications for "ground" mounting as against "roof" mounting, except that the base is 28 inches above the vessel's load water line. This exceeds the recommended maximum distance above "ground" by 16 inches. However, no variations in VSWR have been detected in very rough seas when the recommended 12 inches above "ground" varies from a few inches to three or four feet. The same holds true in a heavy swell when the height of the antenna base varies that much or more with respect to "mean sea level" of the ocean.

Corrosion Problems

To protect the antenna from corrosion which occurs quite rapidly to unanodized aluminum in a salt air atmosphere, all aluminum components were well treated with a zinc chromate primer followed by several coats of first-quality marine top-side paint. Also, to hold rf power leakage to a minimum, the antenna insulator sections are copiously sprayed periodically with Krylon acrylic spray. However, corrosion due to dissimilar metals is admittedly a problem, particularly where the copper bars are fastened to the outboard motor support plate and where this plate is joined to the stainless steel rods. As a deterrent, these joints are heavily painted over, or "sealed" with zinc chromate.

On the other hand, corrosion caused

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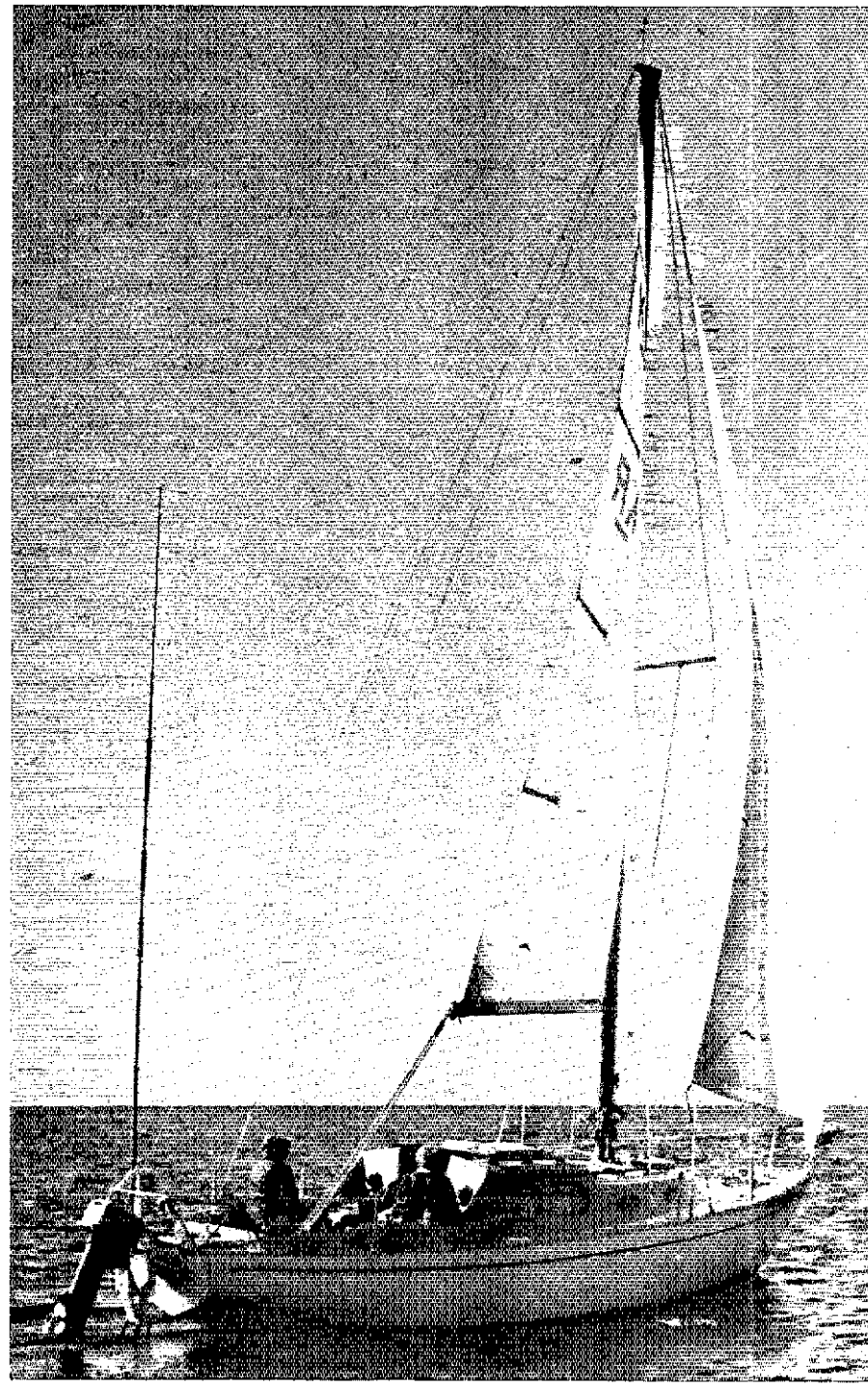
by galvanic action (electrolysis) between the trailing copper tubing, the brass rudder post and the depth-finder transducer copper housing is not evident. The propeller assembly of the outboard is in the water so seldom it is not considered a factor. Were there an inboard motor propeller and shaft, plus other metallic fittings protruding from the hull below the water line, then a small zinc plate or two, fastened near the rudder would be very much in order as a protective measure. Incidentally, *Flicka's* 2,650-pound lead keel is a casting molded inside the fiberglass. Hence, it is not in contact with the salt water.

The electric starter, ignition system and alternator of the outboard motor and the depth finder operate from a negative ground. The negative terminal of the 12-volt battery, which may be charged from dockside power or the motor's alternator, is grounded to the brass rudder-post sleeve bearing inside the hull, as is the transceiver. The radio direction finder carried aboard is portable and operates from self-contained dry cells, so it's not involved in this discussion. Although we don't worry too much about electrical storms along the south coast of sunny California, nevertheless the 14 AVQ is reasonably protected from lightning damage by its "built-in" dc ground. That's about it for the boat's ground system(s), except, that for anyone planning a ham-rig installation aboard a similar vessel with an *inboard* auxiliary motor, I believe I would suggest copper sheathing the fiberglass rudder *only*, in lieu of trailing copper tubing astern. It certainly would make a much "cleaner" ground system and also avoid the dissimilar metals problem described above, although the initial fabrication could be a bit more expensive.

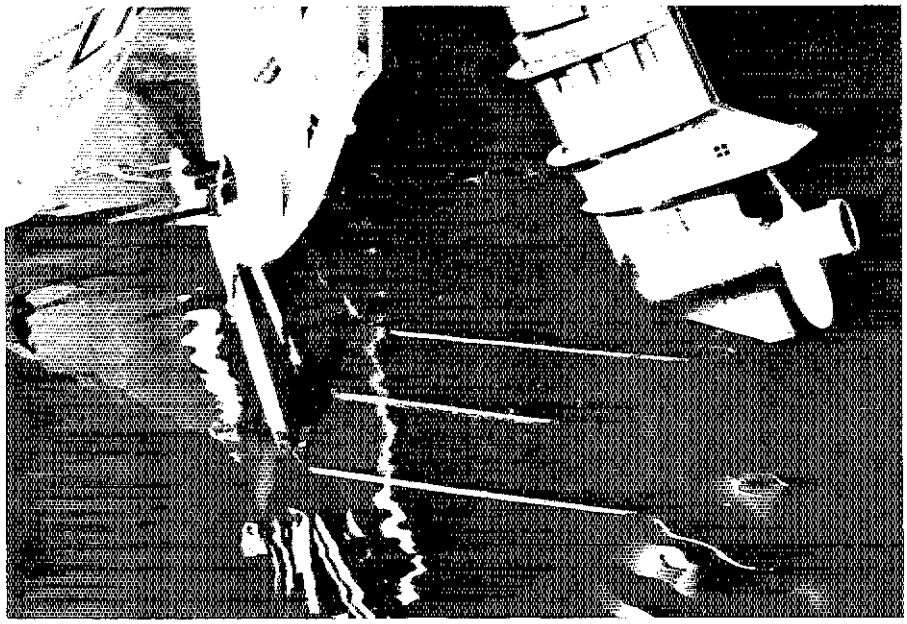


The Transceiver Installation

The radio set installed aboard *Flicka* is a Ten-Tec Triton II all solid-state 200-watt transceiver. The reason this particular rig was chosen is because of the low power drain – 18 A at 12 volts with the key down – and its instantaneous break-in feature on cw. I became accustomed to full break-in many years ago and simply can't break the habit now

The transceiver's 50-ohm output impedance is matched to the antenna's 50-ohm rated impedance via a 46-foot length of RG-8/U coaxial cable. The SWR is less than 1.3:1 over the cw segment of each band. Actually, the SWR on 7025 kHz and 14,025 kHz is 1.25:1 which coincides almost exactly with the typical SWR curves given by the antenna manufacturer. It may be gathered that the antenna is adjusted for the cw mode of operation per the specifications. Despite this adjustment, operation in the phone-band segments is entirely satisfactory. For example, the SWR on 7300 kHz is only 2:1. Thus, 7255 kHz, the ham's unofficial Mayday frequency, is well within the vessel's capability if ever needed.

There is a reactance characteristic with respect to *Flicka's* antenna installation which could well be common to other vessels of her design. It was found that when the aluminum mast and boom, the stainless-steel standing rigging and the forward pulpit were directly connected by the port and starboard stainless-steel life lines to the antenna ground system described above, the SWR on 14,025 kHz, for example, increased from 1.25:1 to 2.25:1. Furthermore, when these contiguous metallic elements were also connected to a separate salt-water ground opposite the mast, the SWR soared out of sight. The transmitter fuse would blow before a reading could be taken on the SWR meter! Obviously, the standing rigging, and so forth, when grounded in parallel with the antenna ground, produced a capacitive reactance way out of tolerance. This intolerable condition was corrected by inserting insulators where the lifelines join the after pulpit.



The trailing copper-tubing ground system as described in the text is visible in this photograph of the stern mount.

Let me hasten to add, however, that the vessel's standing rigging, either with or without grounding, *does* serve as an efficient ground plane for a mast-head-mounted whip antenna. A base-loaded vertical was test operated there with excellent results. The SWR on 40 and 20 meters averaged 1.4:1. But, unfortunately or not, the mast-head location on a sloop is best reserved for a vhf marine radio antenna due to the line-of-sight characteristics of vhf wave propagation. Then too, the mast head on most sloops supports a wind vane, an anemometer, and an anchor light which must be visible through 360 degrees, per Coast Guard regulations. Also there is another objection, though not serious — the job of fastening coaxial cable to the mast. Last but not least, unless one has a trained monkey aboard, changing antenna loading coils atop the mast could be a neat trick, especially during a small gale. Of course, there are mobile whips made with remote-controlled band switching. Oh well . . .

The mast back stays (there are two on *Flicka*) were never considered as a possible antenna due to the requirement for a transmatch, which means another piece of gear to require tuning when changing bands and to take up valuable space in a small cabin. Incidentally, operation on 80 meters was never considered either since FCC regulations state in effect that amateur radio stations aboard vessels sailing within International Regions — Region 2 in this case — are not permitted to operate below 7 MHz.

The operating position aboard *Flicka* is built into the after end of the main cabin on the port side. This location has proved most convenient for both cw and ssb contacts while at sea. Actually, with a long microphone cord and headphone extension, net QSOs are readily possible while the operator mans the helm. But perhaps most important, the location is clear of the main "alleyway," the navigation table and *especially* the galley!

Does It Work?

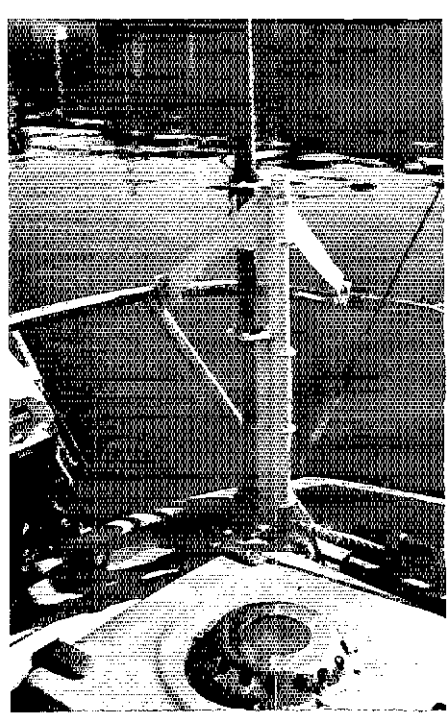
As to operating, *results* are what count. When conditions are right, all continents are easily worked on 20-meter cw while *Flicka* is docked at her slip in the Oceanside (California) marina. Signal-strength reports compare most favorably with those logged at my home station at Laguna Beach where I operate another Triton II, but with an inverted V on 40 meters and a 3-element trap beam on 20, 15 and 10 meters. Better yet, signal-strength reports and strength of received signals average a good three or four S units higher when the vessel is cruising off shore under sail than at dockside. The reason for these improved results while at sea is probably because there is no power absorption or shielding by masts and rigging of other sailing yachts, such as those which jam the Oceanside marina. But best of all, the real joy of operating at sea is the total absence of obnoxious power leaks and other frustrating man-made QRN!

The near emergency mentioned at the beginning of this article occurred as follows. Very early one October morning my first mate, W6KHA, and I were sailing *Flicka* down San Diego Bay bound for Oceanside. We had barely rounded the kelp beds off Point Loma and were headed northwest when the breeze quit. We started up the trusty outboard and continued under power. Then, as we were passing La Jolla, the outboard quit too.

For the next two hours we slatted around helplessly in a dead calm while speculating on whether the strong tidal current would carry us into the dense kelp beds, or onto Point La Jolla's rocks. Fortunately, a light air came to our rescue and we were able to claw off shore a safe several miles. After a while a northwester set in, which slowly but steadily increased to at least eighteen knots (so we estimated). But a northwester gave us a long, tough beat to windward over the remaining 25 nautical miles to Oceanside. The one and only comforting feature of this adventure in discomfort was that we enjoyed ship-to-shore radio communication with a group of most unsympathetic old-time brass pounders, namely K6SA, WB6DUC, W6QA, W6AAK, W6SRI, W6AW and W6YD. To play it safe, we set up an hourly schedule on 7084 kHz with W6YD over in Vista, with K6SA in Los Gatos and W6QA in Santa Rosa both standing by in the event short skip should set in.

By telephone, W6YD checked the Oceanside WX for us. He also attempted to appease any worry on the part of our wives by reporting our progress and adding confident assurances (his) as to the well-being of their ever-loving husbands. He thoughtfully failed to mention the conked outboard. Nor did he mention the Oceanside WX. But the

This is the support bracket installed between the antenna base section and the pulpit rail on the stern of the boat.



Harbor Patrol did! They advised our wives (who'd asked) that unusually heavy seas caused by a hurricane in the South Pacific were now breaking over the Oceanside bar, thus making the entry into the harbor extremely hazardous. We figured they should know, as the year before they lost their 30-foot, $35,000 patrol boat when it broached to, capsized and sank while attempting to run in over the same bar under the same sea conditions.

To make a long tedious voyage short, finally at 9:00 P.M., 14 hours out of San Diego, we advised W6YD we were abeam Oceanside. He immediately relayed the report to our wives who were anxiously standing by a pay phone on our boat dock. He added, "Don't worry, they'll probably be there in a couple of minutes."

We had every confidence in *Flicka*. The 18-knot breeze would be in our favor. Visibility was good. So we decided to give it a try. We came about and headed for the harbor on a broad reach. We crossed the bar just as a huge roller loomed up out of the darkness astern. We watched it break into boiling foam. Luckily, we kept ahead of it and ran in between the harbor entrance jetties to safety — and then sailed leisurely up to the dock.

No doubt our wives would have panicked beyond belief were it not for the reassuring reports of W6YD. Sure, we could have used vhf marine radio. But what impersonal telephone company operator would have shown the same loyalty and concern over our predicament as a fellow amateur? Besides, ship-to-shore communication via ham radio — compared to commercial — is one whale of a lot more fun. We think so anyway. QST

Strays

AMATEURS ASSAULT THE ARCTIC, AGAIN

When a group of local scientists is doing geophysical research in polar regions north of Alaska, how do you keep in touch with hometown folks?

Amateur radio and Oscar.

After my continually needling WTIC News Director Paul Kuntz about the achievements of amateur radio, he handed me a story of our local expedition and challenged, "If your ham radio is so good, why don't you set up to interview our scientists while they are up on the Braufort Sea?"

And what ham could resist a challenge like that?

A team of University of Connecticut marine scientists have spent the past two summers studying the continental shelf and slope in the Braufort Sea, north of Alaska. They've been making geophysical measurements, charting the force of gravity and developing bathyometric charts of the area.

Teams from Connecticut and Oregon were scheduled aboard the U.S. Goast Guard icebreaker *Glacier* this past summer.

Why not record interviews by ham radio for rebroadcast over WTIC a-m/fm? There were a half-dozen reasons why not. One by one, they were reconciled.

The Federal Communications Commission cleared the idea provided certain rules were observed. The permission of the hams involved is required. It cannot be for commercial purposes. And there can be no mention of the rebroadcast in the part of the interview to be rebroadcast. The use of informal, third-party messages as would be sent to families and friends would be permitted.

U.S. Coast Guard headquarters in Washington, DC was delighted and offered to help in any way they could. Electronics Officer CWO L.F. Nuzman at 11th District Headquarters in Long Beach, California, answered questions about the ship's communications capabilities. But he was concerned that ungrounded superstructure might prove a problem. It did.

Propagation had been such that even the military had troubles getting their 10-kw signal up into the Arctic. Twenty meters offered little chance of successful contact between the Arctic and the East Coast.

WTIC Engineer Richard Zwirko, K1HTV, suggested Oscar.

There wasn't time to consider the government buying a ham station to work the amateur satellite. Mike Stahl of KLM Electronics agreed to put an Echo II two-meter transceiver aboard for the voyage. The trip gave a tough field test also for KLM's new two-meter antenna.

Amsat sent up a 432-band transmitter so the ship could operate Mode B.

UConn's Spencer Trombley, W1GAK, built a 10-meter pre-amp for the ship's receiver. He was the electrician for the scientific expedition. In California, Spence and WA7NMF of the ship's company set up the gear.

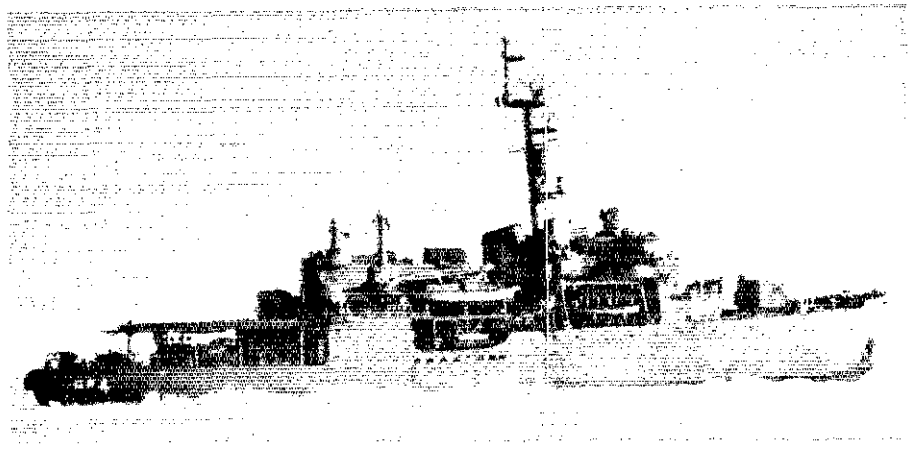
Enroute north, WA7NMF made a number of contacts through Oscars 6 and 7. Our primary station in Connecticut, K1HTV, made contact, checked out his recording equipment and set schedules for contacts once the local scientists were aboard. WA1RZA was set to record the same QSOs in the Hartford area.

Then nature proved again she's more powerful than all of man's technology.

A north wind shoved the pack ice against the northern coast of Alaska holding the ship near port. While trying to escort supply barges into Prudhoe Bay, the *Glacier* lost a propeller and the reduced capability ended the expedition.

The scientists were taken off the ship by helicopter and they returned home.

While the mission failed, the system proved out. Oscar can work where other modes can't and when the expedition resumes next summer, we'll be ready. — *Bill Clede, WA1RZA*



Marine Mobile Revisited

Anchor, plug the rig in and work the world! It's easy and fun. Here are more maritime hints and kinks from an extended Caribbean cruise.

By William H. Trayfors,* WA6CCA

In the wake of K6UJ's excellent article,[1] here are a few of my own recent experiences with marine mobile operation aboard a similarly small sailboat. These confirm much of what Brandon observed on his 27-foot sloop, *Flicka,* but I also encountered some variants and new wrinkles which may be of interest to others.

During the summer of 1975 my family and I chartered the 34-foot (10-meter) Pearson sloop, *Joker,* for a two-month, 1000-mile cruise through the eastern Caribbean. Though a fast boat, she is designed and equipped for comfortable cruising by owner Dick Avery in St. Thomas, U.S. Virgin Islands. Also, we learned, *Joker* is a most exquisite platform from which to hang a 20-meter dipole.

The Portable Installation

Because it was a chartered vessel I had no permanent ham shack on board. Instead, I had a brand new Atlas 210 that could be set up in five minutes. My sons and I always dismantled the whole lash-up before sailing, putting the little rig away safely in a heavy plastic bag. Later, at anchor, it was necessary only to snap two big alligator clips onto the boat's 12-volt storage battery, plug in the mic and antenna, check the SWR, and I was on the air. The usual placement was atop the chart table, but frequently we'd put the rig on the cockpit bridge deck.

I found that no ground other than the boat's was needed. The Atomic-4 inboard engine was grounded through the Monel shaft and bronze propeller. This was perfectly satisfactory when in salt water, confirming what I had heard from others and experiences on my 38-foot ketch, *Tradewinds.* Conclusion: No need to use a separate ground in salt water at these frequencies.

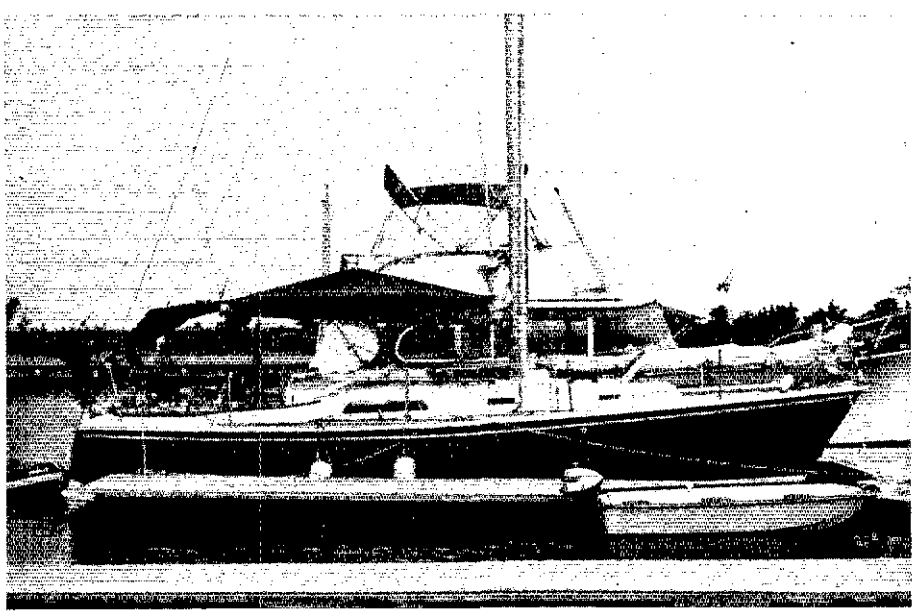
An Antenna That Really Works

On this trip I tried an idea first suggested to me by two round-the-world small-boat sailors, Cliff, VS9MOR, and C. A., HP9XCD. Both of these deep-water types have been using with great success a double-bazooka dipole constructed from RG8/U coax (*The Radio Amateur's Handbook,* 1975 edition). After hearing these antennas on the air, I was impressed enough to build one.

They related the details, but somehow I managed to lose the notes I had hastily jotted down. When it came time to build my bazooka all I could remember was that it was a type of dipole constructed from coax cable. So, without benefit of the *Handbook,* I cut two lengths of RG58C/U, soldered the center lead and braid together at one end of each, and connected those shorted ends to a balun with about 50 feet of lead-in. Of course, this configuration was just a plain dipole. I thought the main idea was to protect the radiating element from saltwater corrosion

Despite my construction goofs, I did remember how to correctly rig a dipole on a sloop. Merely attach one end to a spare halyard and hoist it to the top of the mast. Tie the other end on the stern pulpit and as far to the side as possible so as not to be too close to the standing backstay. Let the lead-in fall where it will and bring it belowdecks through any convenient opening.

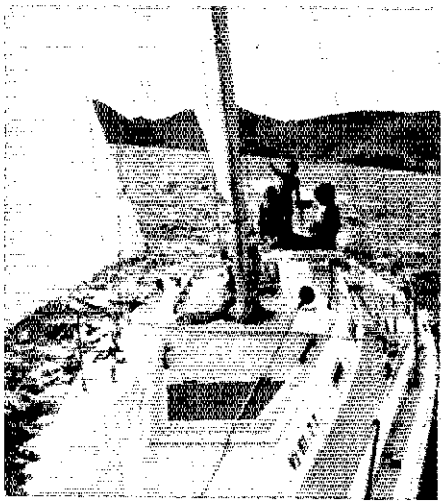
After a bit of trimming I got the



Balun and dipole are to the upper left of the main mast. Here, *Joker* is at Little Dix Marina, Virgin Gorda.

*Kathmandu (ID), Department of State, Washington, DC 20520

[1] Wentworth, "Marine Mobile Under Sail," *QST,* March, 1976.



The dipole extends from the mast to the sloop's stern pulpit while underway.

SWR down to 1.1:1 at 14.3 MHz. Although I had not built a real bazooka, the first CQ brought WA4ELW with a 59 report and 30-minute ragchew. I can guarantee you that you're certain to have more fun working 20 meters with a portable rig and vertical dipole over salt water than from any other QTH. Reception was fantastic and signal reports were truly stupendous. In one QSO after another, I was accused of running up to 10 kW and a 5-element beam. Signal reports sometimes run like fish stories, I admit, but you need not believe me; try it yourself. The gain of a plain dipole vertically strung, compared with a whip antenna, over salt water, has to be experienced to be believed.

There are, of course, drawbacks. This may be a neat arrangement for chatting on the rig while at anchorage or when you're on the same tack for hours or days during a long voyage, but it is not well-suited to the communications needs of the weekend sailor while underway. The lead-in gets in the way when you're tacking ship. I've thought about ways to overcome this problem, but have tentatively concluded that there may not be any simple answer.

An idea for a yawl or ketch might be to run the feed line up from the center insulator balun to a point near the truck of the mizzenmast, then down the mast to the rig. On a sloop or cutter it might work OK to tie the feed line somewhere up the standing backstay and lead it down the backstay.

Physical strength is another problem. Forget RG58 if you plan to make a bazooka dipole; it's not strong enough. A small boat is subjected to much roll, pitch, and yaw — all of which make such an antenna with a center insulator or balun strain mercilessly. Mine lasted about two weeks before it snapped. But Cliff's and C. A.'s, made from RG8, lasted halfway around the world.

In a later discussion with Cliff, I concluded that the best alternative is probably to construct a dipole from stainless-steel wire rope. This could be either a permanent installation set as a backstay using appropriate strain insulators or a portable rig with lighter, more flexible stainless-steel wire for easy storage and reduced windage.

About Other Bands

OK, you say, fine for 20 meters, but suppose I want to work 15 meters? After my original dipole busted, we used a spare Hy-Gain tape dipole that has stainless-steel elements and it performed great on both 15 and 20 meters.

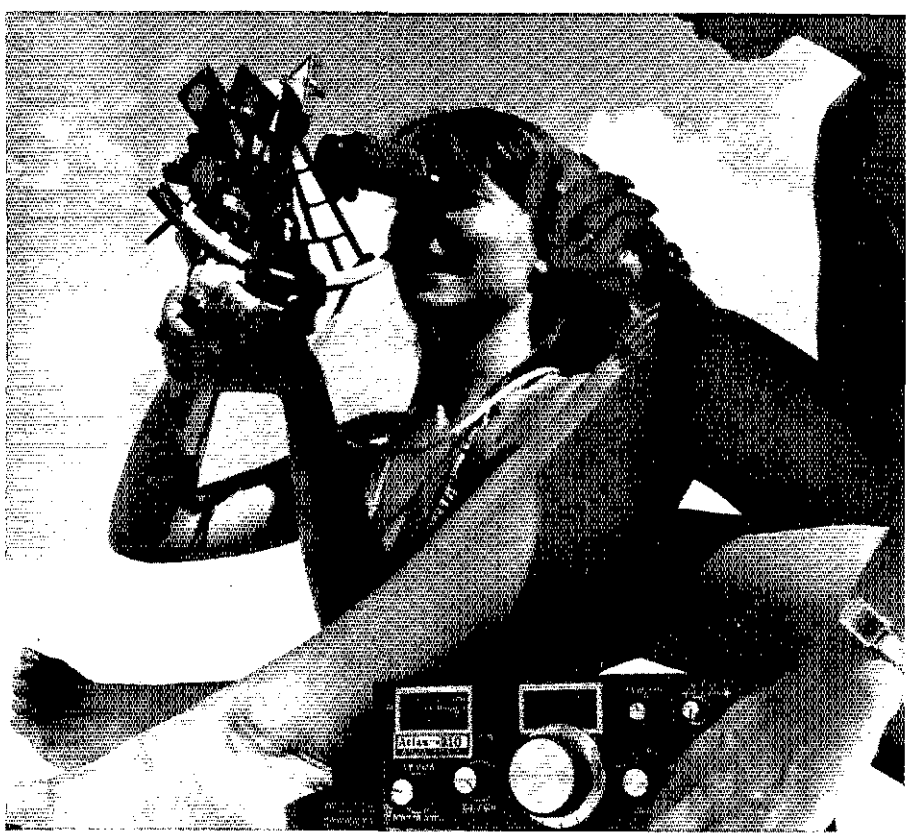
Early in the cruise I made contact with my friends to meet at English Harbour, Antigua. As Cliff's 38-foot yawl, *Moriah*, neared the Caribbean, the skip on 20 became too long for good contact, so each night we relayed through Bob, K4MZU, in Miami and decided to try 40 meters.

With the help of John, KV4IF, I constructed a simple quarter-wave vertical from 12-gauge stranded wire. This was hoisted to the mast truck and at the lower end was terminated at an insulator that was tied to the stainless stern pulpit. We grounded the pulpit to the standing backstay, already grounded to the water and other standing rigging, fed the wire going up to the mast at its lower end, and used the pulpit-ground as a counterpoise. After some trimming, the SWR was a nearly flat 1:1. I had no problems making contact with Cliff after that. This arrangement, however, will only work well if you use stainless-steel fittings and wire rope for the radiating elements. The copper wire we used lasted only a few weeks before it was too corroded for service.

Operation in Port

When in the proximity of other sailing yachts you will probably find, as I did, that your SWR goes mad. Once, in a Roadtown, Tortola, marina I spent the better part of an afternoon checking, trimming, rechecking, and retrimming the antenna, and still could not get the reading below about 1.5:1. Fretting over a cold 807, it suddenly dawned on me that all the rigging nearby could be a problem. A quick move to a location away from most of the other boats brought the SWR down to a satisfactory 1.2:1.

If you go abroad, sometimes it pays to get a reciprocal license. While still in U.S. waters I inquired of a friendly VP2V about getting a British Virgin Islands call sign. He gave me excellent instructions and encouragement, which I promptly followed upon arrival in Roadtown. With the taxi literally waiting outside I went to apply for a call,



Keep your bearings! On the high seas it takes an able crew and the right gear to stay on course.

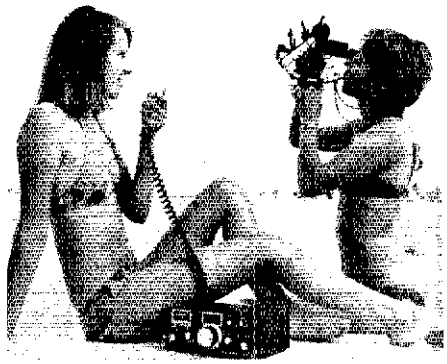
my U.S. license in hand, and exactly 11 minutes later had VP2VCS/mm. This call allowed me to stay on the air while in British waters and work 20-meter phone down to 14.1 MHz.†

My first contact with this new call was G4GI who gave me a generous 58 report. Friends in nearby boats were most impressed, particularly since they were unable to raise the St. Thomas marine operator, less than 20 miles away, on their vhf rigs.

Meeting Friends

In boating, they say it's the people you meet who make it all worthwhile. I found this to be doubly true when you move your ham rig aboard. We met dozens of ham friends all over the Caribbean, had eyeballs with five new-found ham friends, three of whom were MMers, and were generally made to feel a part of the local scene.

Most memorable, however, was our scheduled meeting with VS9MOR and



In times of distress your maritime crew has a choice of an ancient sextant or a modern amateur rig to provide aid.

family at English Harbour. Though we had talked many times before during their passages around the world, this was our first eyeball. While we spent four days together in a quiet Virgin Island anchorage, Cliff and I swapped lies about great voyages past and future. It ended all too soon with K4MZU's report that the developing hurricane in the eastern Caribbean had blown itself out. Taking advantage of the favorable weather report, we all said good-bye.

Our family returned *Joker* to Avery's and headed back home to the high Himalayas. Regrettably, there are no 9N1 tickets to be had there, but already we're planning our next marine mobile adventure. Try it; you'll be hooked in no time at all. And don't forget to take along that 20-meter dipole! QST

†Editor's Note: When beyond the territorial limits of any government jurisdiction, FCC licensees may operate as provided by §97.95(b) (2), " . . . operation may be conducted within Region 2 on any amateur frequency between 7.0 MHz and 148 MHz, inclusive; and when not within Region 2, operation may be conducted only in the amateur bands 7.0-7.1 MHz, 14.00-14.35 MHz, 21.00-21.45 MHz, and 28.0-29.7 MHz." Generally, Region 2 includes North America, South America, and surrounding waters. Check the ARRL *License Manual* for details.

Strays

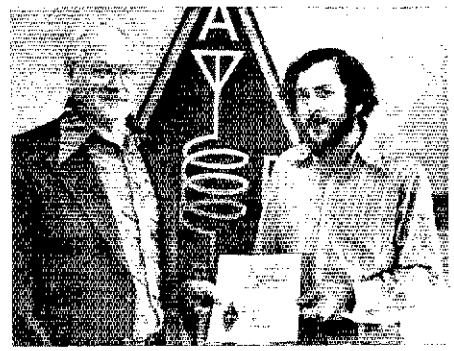
□ Hams may have married hams before, but Derrick and Amanda King, VE7BFO and VE7AQS, also had a ham conduct their ceremony – Rev. Douglas Millar, WBØNST. The event took place at Silver Lake, ND, where Doug is pastor at Nordland Lutheran Church. All three had met during the summer while working on projects at a United Nations Conference in Vancouver, BC. From there, the couple went to the wedding site, selected "to please the relatives as it's quite close to halfway between Vancouver and Newfoundland." The newlyweds kept in touch with friends along the way with a 2-meter hand-held transceiver.

Derrick and Amanda King, VE7BFO and VE7AQS, with Rev. Douglas B. Millar, WBØNST, at their lakeside wedding. Ruth Millar, SWL, is looking on at the first all-ham wedding in that area.

□ The Hoosier Hills Ham Club of Lawrence County, Indiana, assisted officials of the Mitchell, Indiana, Chamber of Commerce by providing communications for the 30th annual Persimmon Festival Parade held September 25, 1976. The two-hour parade culminated the week-long celebration which attracted visitors from throughout Indiana. More than 10,000 spectators, including Indiana Governor Otis Bowen, viewed the parade, which contained over 50 units. Three separate stations operated on 146.94 MHz to link the reviewing stand of the parade with both the start and finish areas of the parade route. In addition, a parade entry operated as a mobile unit within the parade to inform the reviewing stand of progress and problems along the two-mile parade route. Parade officials sent and received in excess of fifty messages concerning changes in the order of parade units, and, more importantly, notifications of winning entries at the final check out. The club was called upon to assemble an impromptu public-address system at the reviewing stand when it was discovered speakers there had been removed the night before the parade. Participating in the club project were Larry Foster, WB9DNB; Joe Hall, WN9WBC; Bill Jenkins, W9WHL; Harold Lee, W9KWB; Stanley Mize, WB9CBX and Club President Butch Robison, K9ZRL.

NEW CONTEST CERTIFICATES

□ The very first of a new generation of contest certificates went to Arnie Freeman, W2YD, when he dropped by Hq. early in October. A particular contest will be identified by one of four colors – red, gold, blue or green – embossed on the ARRL diamond. Arnie won a red certificate, being presented here by Assistant Communication Manager WA1STN, for the 1976 DX Competition. The new wallpaper is now being awarded for all ARRL contests.



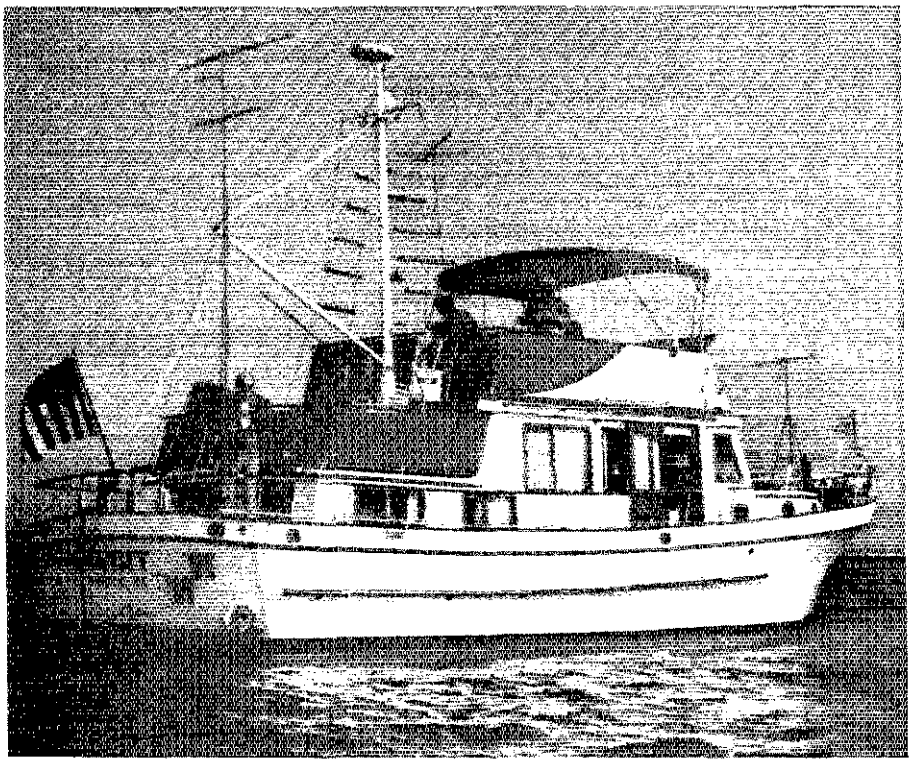
STOLEN EQUIPMENT

□ GTX-1T Handie-Talkie, serial no. 10-59, stolen from booth at Genave Radio Expo '76 in Chicago, Sept. 18-19. Claude L. Henderson, General Aviation Electronics, 4141 Kingman Dr., Indianapolis, IN 46226.

Casting Off With Ham Radio

Own a boat, or thinking of getting one? Don't forget to take Amateur Radio along when you hit the water!

By Rick Booth, KM1G
c/o Offshore Publications
PO Box 817
Needham Heights, MA 02194



Amateur Radio and boating are natural for each other, as exemplified by W1TUM's maritime mobile operation in the September VHF QSO Party. Give it a try! *(photo courtesy W1TUM)*

Americans have been turning to the water for recreation by the tens of thousands recently, and boat sales have soared in the past five years. If you're among the wave, do you take Amateur Radio along with you? If not, you may be catching one boat, but missing another.

Of course, boats and radio are old chums. Most boaters are familiar with marine VHF, the channelized FM service at 156 MHz. The solid-state revolution that has swept hamdom has also brought small, affordable, bulletproof VHF rigs to boaters, and it's easy to obtain a license, *if* you own a boat. That's the bright side.

Unfortunately, there is a darker side as well. Marine VHF is without Amateur Radio's rich tradition of good operating practice. A few hours spent listening to marine VHF can sour anyone. A lot of nonham boaters I know won't even turn their marine rigs on, its mindless anarchy unnerves them so. But at least they *know* about radio, what it is—and what its potential is.

Imagine their delight when I introduce them to 2 meters with my little hand-held. Repeaters are virtually unknown to them, and the distances I can reach blow them away, thanks to flat "terrain." Moreover, they're awed by the number of hams who can take part in the same roundtable—no confusion, no anarchy, no wasted time. That such courtesy and skill allow so many hams to use the same air at the same time is a revelation to boaters, a miracle on the order of water to wine.

Of course, I'm careful to choose repeaters which I know are frequented by good ops, and I'm careful to add the disclaimer that ham ranks have their share of bad apples—and usurpers.

From that casual 2-meter demo, I slide right into my pitch on high frequency and the incredible array of modes open to licensed amateurs. These demos do as much for me as they do for my subjects—having seen those wide eyes and heard those exclamations, I'm not likely to take this hobby's wonders lightly.

Of course, *you* don't need to be told about these wonders—you're already on the air. If you're a boater, whatever you do, don't leave ham radio at home when you get under way. Big mistake.

One of the best things about Amateur Radio is that it mixes so well with other hobbies. You've read of backpackers and campers, bicyclists, balloonists, fixed-wing and helicopter pilots who take ham radio along—boating hams do the same. Boating and Amateur Radio mix like peanut butter and jelly.

A Dream QTH

Think about it. Ever long for a wide-open QTH, a place with nothing to interfere with your signal—no buildings, trees, mountains, neighbors or power lines?

Put yourself on a boat, away from shore. Shazam! No obstructions, nothing but (we hope) calm water on every azimuth. There's great operating to be had, routine hamming for sure, and when you add the mariner's periodic need for emergency communications, you've got a powerful brew. There are those who say a boat is the perfect QTH.

Advances in Radio Equipment

It wasn't always so. Sure, the ocean's always been a perfect ground, and it's always been just as flat (*most* of the time). But the rigs, that was something different. Put yourself on a small boat with a National NC-303 receiver and a Hallicrafters HT-37 transmitter. Tubes need high dc voltage; the final plate supply in the HT-37 puts out 800 volts. Tube supplies have to step up the ac voltage and then rectify it. We're talking major power supply here—you might as well leave the YL or OM home. Fishing tackle too. There's no room. In fact, there might not

be room for *you*.

Tube rigs didn't (and still don't) like boats. They need lots of ac; boats normally have only dc from batteries. Tubes don't like vibration, and periodic pounding is part of nautical life. Finally, tube rigs were *big*. Ever heard old gear called a boat anchor? And you thought it was just an expression!

Enter the solid-state revolution. The same technology that swept the racks from your shack also wiped out the single biggest impediment to putting ham radio afloat. Today's HF briefcases thirst for 12-V dc—no tubes to flatten batteries or go south from wave action, and they leave space aboard for something besides radio, like people.

Come Aboard

If you're sold, let's get on with it. Let's get that solid-state, HF rig wired and ready to be fired. The sunspot cycle's about to peak!

Not so fast, mate. If solid-state electronics demolished the single biggest obstacle between hamming and boats, it didn't beat them all. Boats are a special environment. You'll need to do some planning.

Your two biggest decisions will be what kind of antenna, and how to prevent onboard RFI. In the first place, boats don't have the space of home, not even a mobile one on a handkerchief lot. Secondly, RFI at sea can have more dire consequences than it does ashore.

Antennas

Balanced HF antennas are rare on boats; the vast majority are fed against ground. Not only is ground so close and so superb, in the form of water—there isn't room for a dipole or beam. Most sailboat hams use their backstay for an antenna. The backstay is a wire running from the masthead to the boat's rear, or stern. Rare is the sailboat that doesn't have a backstay. Egg insulators electrically insulate it from the rest of the boat's rigging, and you affix the feed line at the bottom egg, creating an end-fed random wire.

You'll need a tuner, preferably at the feedpoint and not near the rig. An automatic tuner (external, not in the rig) is especially suited to the task. Most sailboats have a compartment near the stern called the lazarette; a tuner stashes there nicely.

Beware: If your rig has a built-in tuner, don't rely solely on it. Without a tuner at the feedpoint, you're engraving an invitation to stray onboard RF. More on that in a minute.

You can energize other parts of the boat's rigging, and some sailors like mobile whips. But the backstay is so convenient, and works so well, that most sailors go with it.

Hydrocarbon-powered hams have more leeway. I've seen cabin cruisers with towers and beams, believe it or not, but weight and windage aloft make that configuration a bad idea, even if your boat is big enough. If you're like the majority, you'll choose a mobile whip. As always, be sure it's fed against a good ground. Peek over the boat's side—you're looking at *the best* ground there is.

The Ground

Of course, you've got to harness it, which brings us back to stray onboard RF, which is likely if you're not mindful of ground. Nobody likes stray RF in the shack, but ashore you don't call on electronics to guide your home—satellite navigation (SatNav), top band's old nemesis LORAN, or radar. There's even a new electronic compass, the fluxgate. If you don't check before leaving port, RFI may do to your navigation instruments what the Greeks did to Troy, and a lot faster. Of course, you shouldn't be in a boat unless you can navigate without electronic aids, but if you've got them, why handicap yourself?

Getting to ground can be as simple as a length of conductive ribbon (copper or aluminum) thrown over the side, attached to the ground side of the feedpoint. Use the widest you can get—remember skin effect.

Maritime Mobile Rules and Regs

Situation: You and some friends are boating one mile off the coast of Mexico. You are a ham, but, for some reason, the leash of your FCC license doesn't seem as tight as it did just a few hundred miles ago when you were off the coast of California. "It sure would be nice," you think to yourself, "to operate a little on the ham bands." You know your commercial marine rig will operate in the ham bands. Can you legally do this? No! Not until you meet the special conditions as specified by the FCC and by the country in whose territorial waters you are boating.

"Why not?" Well, for one thing, consider Section 97.101 of the FCC rules. "In addition to complying with all other applicable rules, an amateur radio station operated aboard a ship [or aircraft] must comply with all of the following special conditions: (a) The installation and operation of an amateur mobile station shall be approved by the master of the ship . . .; (b) The amateur [maritime] mobile station shall be separate from and independent of all other radio equipment . . . installed on board . . .; (c) The electrical installation of the amateur [maritime] mobile station shall be in accordance with the rules applicable [to ships as directed by] the appropriate governmental agency; (d) The operation of the amateur [maritime] mobile station shall not interfere with the efficient operation of other radio equipment [on board] . . .; and (e) The amateur [maritime] mobile station . . . shall not constitute a hazard . . ."

Additionally, since you are in Mexican waters, you need to obtain a reciprocal operating permit for Mexico (or whatever country in whose territorial waters you are boating). Your FCC license applies when you are in the US, its territories or on the High Seas (ie, International Waters.) If you're a mile off the coast of Mexico, you're under that country's communications jurisdiction and you must apply to the government of that country in order to obtain a permit. Beware—certain countries have been known to seize gear operated without authorization.

Always check to see if the country in whose waters you are boating has a third-party agreement. In the case of Mexico, we do have a third-party agreement, so you can run third-party traffic while in that country's territorial waters. If the US does not hold such an agreement, you are prohibited from passing third-party traffic. Also, remember the prohibition on business communication in the Amateur Radio Service. You are "mobile" on water rather than land, but the same rules must be followed—except when you are in the territorial waters of another country, in which case you follow their rules. The Washington Mailbox column of October 1988 *QST*, "Amateur Operation On the High Seas," goes further into detail on the "dos and don'ts" of maritime mobile operation than we can here.

"But," you think to yourself, "it would be so 'convenient' to use the commercial marine rig to make that phone patch on the ham bands." It would be too convenient. The rules of the Amateur Radio Service are there to protect *us* and it is up to *us* to abide by them. If faced with a life-or-death emergency, almost "anything goes" since the providing of emergency communications is one of the basic purposes of the Amateur Radio Service. This privilege should not be abused. A boater should not possess an amateur rig to be used "only in emergencies" if he or she has no intention of obtaining an Amateur Radio license. Our spectrum is far too precious to be abused.

So, if you are operating your station maritime mobile and you decide to break a rule—"just once out of convenience"—remember that your fellow hams are counting on you and you on them to follow "the rules," to follow the Radio Amateur's Code and to uphold the tradition Amateur Radio offers.—*John C. Hennessee, KJ4KB*

Trailing ribbon is the quick and dirty way to find ground. It works, but it can have dire consequences if the engine is running. If you back the boat down, the ribbon can get caught in the propeller, and there's always the outside chance of the ribbon drifting forward. Best use another route.

A grounding method that doesn't actually use the water is to run conductive (read: copper) strips along the inside of the boat as a counterpoise. Shoreside hams do it with success. Trouble is, finding a convenient run that's a quarter wave on your favorite band might be a little tough in a boat's tight quarters, especially if your favorite band is 75 meters. The bright side is that a counterpoise can cut down onboard RF. It's especially useful in that capacity when used in conjunction with the third, last and best ground system.

A Serious Marine Ground

If the under-way ham bug really bites, you might as well get serious. Next time the boat's in dry dock, plan to have a ground plate installed on the underside of the hull. Naturally, ensure that it's installed in a seamanlike manner. It doesn't make much sense to use ham radio to call MAYDAY because you're sinking when the cause of your leak is poor through-hull fittings on your ham ground!

The plate's size can vary considerably. For plain copper, some sources recommend a pretty sizable slab; 12 square feet is mentioned often. That's hard to find on a 20-foot walkaround outboard boat.

Fortunately, many reputable marine electronics outlets offer specially fabricated plates made of porous copper to fool electrons into thinking the plate is much bigger. The hull-plate method offers not only the best ground method for your ham station, but you can also tie all the boat's electronics into it.

Give It a Try

Don't think that HF is the only game in town, or that you have to plan an ocean crossing before you can get on the air. You can have just as much fun sitting a mile off your favorite beach, working DX on 10 or 15 meters with simple monoband whips, as you can back home with your tribander-tipped tower. And you might be surprised at what you can do with VHF offshore. Even if you just take your outboard for a little fishing and throw a hand-held in your pocket, repeaters you usually don't hear can beckon. Park a 5/8-λ whip on there, or, better yet, a collinear array, and you're into some serious fun with only a hand-held.

Better still, take advantage of what your boat can do that the home QTH can't. It's *mobile*. It can move. Many's the ham who has found Amateur Radio handy in a strange land, even a county or two away. There's a never-ending supply of advice and directions, besides the usual rag-chewing fun. Take a run down the coast a few miles, cross the big lake and see what's on the other side. Ham radio will be there, and the hams waiting will greet you with open arms.

Just don't forget to take time demonstrating Amateur Radio to your nonham boating friends. I can use all the help I can get.

Strays

WHAT'S YOUR NAME?

☐ It was one of those dreary, but hamperfect, winter afternoons that I made a RTTY contact with KBØM (Duane) that triggered this incident.

After my initial greeting, I transmitted my RTTY brag tape which mentions that I was a high speed (Mil-Spec #777) fixed-station radio operator assigned to 8th Army Headquarters in the South Pacific during WW II.

Once the island of Leyte was secured, 8th Army management turned its attention to other nearby major islands. I was ordered to join the radio team assigned to the newly acquired communication ship *PCE 850*. This vessel was a floating command post with full communications and secret code facilities for use by the commanding general and staff if they needed it during invasion operations. The officer in charge of our communications team was Lt Daniel H. Mercer.

When Japan signaled its desire to surrender, our communications team was ordered to Tokyo Bay as initial occupation troops. We were anchored off the bow of the *Missouri* and were witness to the surrender ceremonies.

Shortly after our arrival in Tokyo Bay, we were ordered to disembark and take up duty in Yokohama at the Court House Army radio station, already in the process of being set up by the 8th Army. All during this time our radio team continued under the command of Lt Daniel H. Mercer.

In the months after the surrender, our wartime company started to disband as we were ordered home for discharge. January 1946 was the last time I saw my group as we scattered to the 48 states.

From 1946 to 1980 I had no contact with communications or electronics other than as a consumer. My time and efforts were directed to business except for time spent boating. During 1980, I began to think of retirement, and it occurred to me that I was in need of a full-time hobby. A local illegal (high-power) CBer was receiving negative publicity in the newspaper at that time. The article mentioned the merits of ham radio and triggered my curiosity. I made contact with the local ham club and attended the Novice and subsequent upgrade courses.

Upon completion of the Novice course, I became a member of the South Jersey Radio Association and began attending the club meetings. It was at one of the meetings that I asked several members about mini quad antennas, as I was interested in one for the station that I was installing.

I was advised to call a member named Howard and I did. We talked for over an hour, and he patiently answered all my questions. During the next five years of membership in the club, I never got to meet Howard or be in contact with him again.

Upon retiring from business on July 31, 1984, my wife and I moved to Punta Gorda, Florida. My station was set up immediately, and I became active in the local ham community. On January 9, 1986, almost 40 years after my discharge, I was in RTTY contact with KBØM when another station (W2FAZ) broke in with a message directed to me. WHAT'S YOUR NAME? K. I responded with my name, and he came back THIS IS EX-LIEUTENANT MERCER ALSO OF 8TH ARMY HDQTRS. RADIO.

He became so excited he asked for my phone number and called me long distance, not taking any chance of propagation dropping out. He discovered that I don't live far from his daughter, and right then he announced his plan for visiting me. He arrived several weeks later, and that's when we both learned how small the world really is.

When he arrived at my home, we began comparing a lot of cross information about the last 40 years. I learned that he lives in Cherry Hill, New Jersey, where I had lived for 10 years before moving to Florida. I learned that he lives no more than 10 minutes away from my former residence. I learned that he belongs to the South Jersey Radio Association but seldom attended meetings. He remembered my mini quad phone conversation with him in 1980, but it took a chance occurrence of his tuning his rig at the right time and the right mode to pick up my brag tape transmission! This is how I came to sort out that military Lt Daniel H. Mercer is really civilian Howard Mercer.

How small the world is, especially in ham radio! And WHAT IS YOUR NAME? K.—*Paul London, KI4XZ, Punta Gorda, Florida*

QST congratulates...

☐ Larnelle "Stu" Harris, WD4LZC, of Louisville, Kentucky on winning the Grammy for Best Male Gospel Vocalist. Stu is an active user of packet in the Louisville area. *Tnx to Paul Cook, KT7H*

I would like to get in touch with...

☐ anyone who has modified the Kenwood TS-520S to use the AUX frequency band for 30 meters or other bands. Anthony L. Kelly, W2HAH, 17 Country Ct, Hicksville, NY 11801.

☐ hams who are high school age and younger interested in daily net on 28.450 MHz at 0000 UTC. Presently the net is meeting on Sundays. Conway Springs Cardinals ARC, c/o Jan-Michael Steen, KAØZZU, Conway Springs High School, Conway Springs, KS 67031.